2009 Emerald Ash Borer Survey
Vermont
Final Report

22 March 2010

		**Target Insect**: Emerald Ash Borer (*Agrilus planipennis)*

A. **Survey Methodology (trapping protocol)**-

The objective of this survey was to determine the presence or absence of *Agrilus planipennis* in Vermont.

One hundred and forty purple EAB traps were set throughout 13 counties in Vermont during the month of June, 2009 and taken down in October, 2009 (Map 1). EAB traps were placed in State park campgrounds where traffic from out-of-state travelers is relatively high and a concentration of traps was also set in the northern county of Franklin due to its proximity to the Carignon, Quebec infestation. These high-risk sites hosted up to 4 traps per site. Remaining traps were placed at other targeted high-risk sites including ash stands located in close proximity to the USA/Canadian border and metropolitan areas (see Table 2 for detailed trap data). Traps were baited with a manuka oil lure provided by USDA-APHIS-PPQ and each trap was visited once during late July-early August for maintenance purposes and taken down in late September.

B. **Rationale underlying Survey**-

The emerald ash borer (EAB), *Agrilus planipennis* Fairmaire, is a non-native invasive pest of ash (*Fraxinus* spp.) trees in the United States. It was first found in North America in the summer of 2002 in southeast Michigan and an adjacent area in Ontario, Canada. It is thought to have been introduced seven to ten years prior to its detection. Emerald ash borer is also established in Windsor, Ontario, was found in Ohio in 2003, northern Indiana in 2004, northern Illinois and Maryland in 2006, western Pennsylvania and West Virginia in 2007, Wisconsin, Missouri, Virginia and Carignan, Quebec Canada in 2008 and Minnesota, New York, and Kentucky in the spring of 2009. The pest is indigenous to Asia and occurs in China, Korea, Mongolia, the Russian Far East, and Taiwan. USDA Animal and Plant Health Inspection Service (APHIS) and the USDA Forest Service are working with state cooperators to detect, contain, and eradicate the pest.

EAB poses a significant threat to North America's ash resources and has no effective natural enemies in North America. Control tactics are extremely limited with tree removal being the principal option. If left unchecked, the pest will continue to infest and destroy native and landscape ash trees, resulting in the loss of millions of dollars

to the forest products and nursery industries. Since it's discovery in North America, Emerald Ash Borer has killed millions of ash trees in Michigan, Ohio and Indiana; caused regulatory agencies to enforce quarantines (Michigan, Illinois, Indiana, Maryland, Minnesota, Missouri, Ohio, New York, Ontario, Pennsylvania, Quebec, Virginia, West Virginia, Wisconsin, and Kentucky) and fines to prevent potentially infested ash trees, logs or hardwood firewood from moving out of areas where EAB occurs; cost municipalities, property owners, nursery operators and forest products industries tens of millions of dollars.

In the eastern United States, nursery, landscaping, timber, recreation, and tourism industries are economically important. Nearly 114 million board feet of ash saw timber with a value of $25.1 billion is grown in the eastern United States. There are over 100 million ash trees in Vermont and they are well-distributed within the state. Most of this is white ash, with a smaller component of black and green ash. Ash is an important component of our hardwood forests. White, black, and green ash are widespread in the forests of the eastern United States and Canada, comprising over 7 percent of hardwood species and 5.5 percent of all species. In Vermont, ash represents over 6.3 percent of the hardwood growing stock trees (5.0 inches in diameter and up) and 3.4 percent of all species. The wood is used for a variety of applications including tool handles, baseball bats, furniture, cabinetry, solid wood products, packing materials, pulp, and paper.

Ash is an extremely popular landscape tree because of its tolerance to poor site conditions. Ash species are currently the most commonly planted tree in shopping centers, industrial parks, and urban developments. It was planted widely in many states to replace elms lost to Dutch elm disease. Common in parks, other public spaces, and neighborhoods across the United States, ash is a prolific seeder and readily establishes along fence rows, right-of-ways, and riparian areas. The spread of EAB could have an enormous impact on the U.S. nursery industry, municipal governments, individual homeowners and the natural ecosystem. Preliminary findings by USDA estimate that the potential impact of the emerald ash borer to the national urban landscape would be a loss of 0.5 to 2 percent of the total leaf area (30-90 million trees) with a value of $20 to $60 billion. As many as 300 million landscape ash trees have been planted in Michigan alone, with approximately 28 million in the infested area. The estimated cost of replacing ash trees in nine selected U.S. cities would be $565 million. Nationwide, the nursery industry produces an estimated 2 million ash trees each year. With median approximate values ranging from $50 to $70 per tree, the ash nursery stock crop is worth between $100 and $140 million annually.

C. **Survey Dates-**

Traps were set in May-June, 2009 and were removed during the month of September and October, 2009.

D. **Taxonomic services-**

All suspect specimens were brought back to the Agency of Laboratory and analyzed as potential targets. Per the Vermont CAPS agreement, all suspect samples were to be sent to Dr. James Zablotny of USDA-APHIS-PPQ in Michigan. While buprestids and several *Agrilus sp.* were collected from traps during the 2009 field season, no suspect *Agrilus planipennis* were identified. With assistance from VT Forests Parks and Recreation and Rick Hoebeke, specimens that were collected from purple traps were identified (Table 1).

E. **Benefits and results of survey-**

State agencies within Vermont have adopted a proactive program of Early Detection and Rapid Response. The national survey aimed to determine whether additional pockets of infestation may exist undetected outside known infested areas and to create a more accurate distribution map of EAB in North America. Surveying for this pest in Vermont complimented adjacent states' survey efforts and provided a contiguous surveyed region (Map 2). Vigorous trapping efforts in 2008 in Vermont did not indicate that Emerald Ash Borer is present in the State yet.

The most recent positive find in Quebec, Canada places the proximity of EAB right at Vermont's doorstep. The current distance from Vermont's border to the nearest EAB infestation site is less than 50 miles. By actively surveying for this pest and determining that EAB is not yet known to occur in the state allows the state to focus on further developing an emergency action plan should EAB be detected in the future and to plan for future detection surveys. The baseline negative data gathered from this survey allows the State to aim for an early detection in the future, should the pest arrive. Identified specimens that were pulled off of the purple traps, although not Emerald Ash Borer provides for valuable data on what species of buprestids are actually present in Vermont.

Table 1: Identified specimens from 2009 EAB purple sticky traps

Species	**# Collected**
Agrilus anxius Gory	11
Agrilus politus (Say)	1
Agrilus sayi Saunders	2
Chrysobothris femorata (Olivier)	2
Chrysobothris sexsignata (Say)	4
Dicerca divaricata (Say)	4

The survey also encouraged the establishment of inter-agency communication and cooperation between the Vermont Agency of Agriculture, Food and Markets and the Vermont Department of Natural Resources, Division of Forests and Parks. Educational out-reach and direct access to State parks are two direct results from this survey. Vermont Forests and Parks were willing to work with the Agency of Agriculture in distributing educational material and also integrated EAB education into their Field Naturalist programs. The high-profile purple prism traps encouraged the public to find out more about the survey and the cooperation and enthusiasm demonstrated by Vermont Park staff enhanced the survey's public outreach aspect considerably.

Media coverage was also a benefit obtained through this survey. Numerous local new agencies and newspaper's covered the story regarding the EAB survey and provided educational access to a larger audience throughout Vermont.

F. **Compare actual accomplishments to objectives established for the period. When the output of the project can be quantified, a computation of cost per unit of output is required when useful.***
All of the objectives stated in the 2009 National Emerald Ash Borer survey workplan were met.

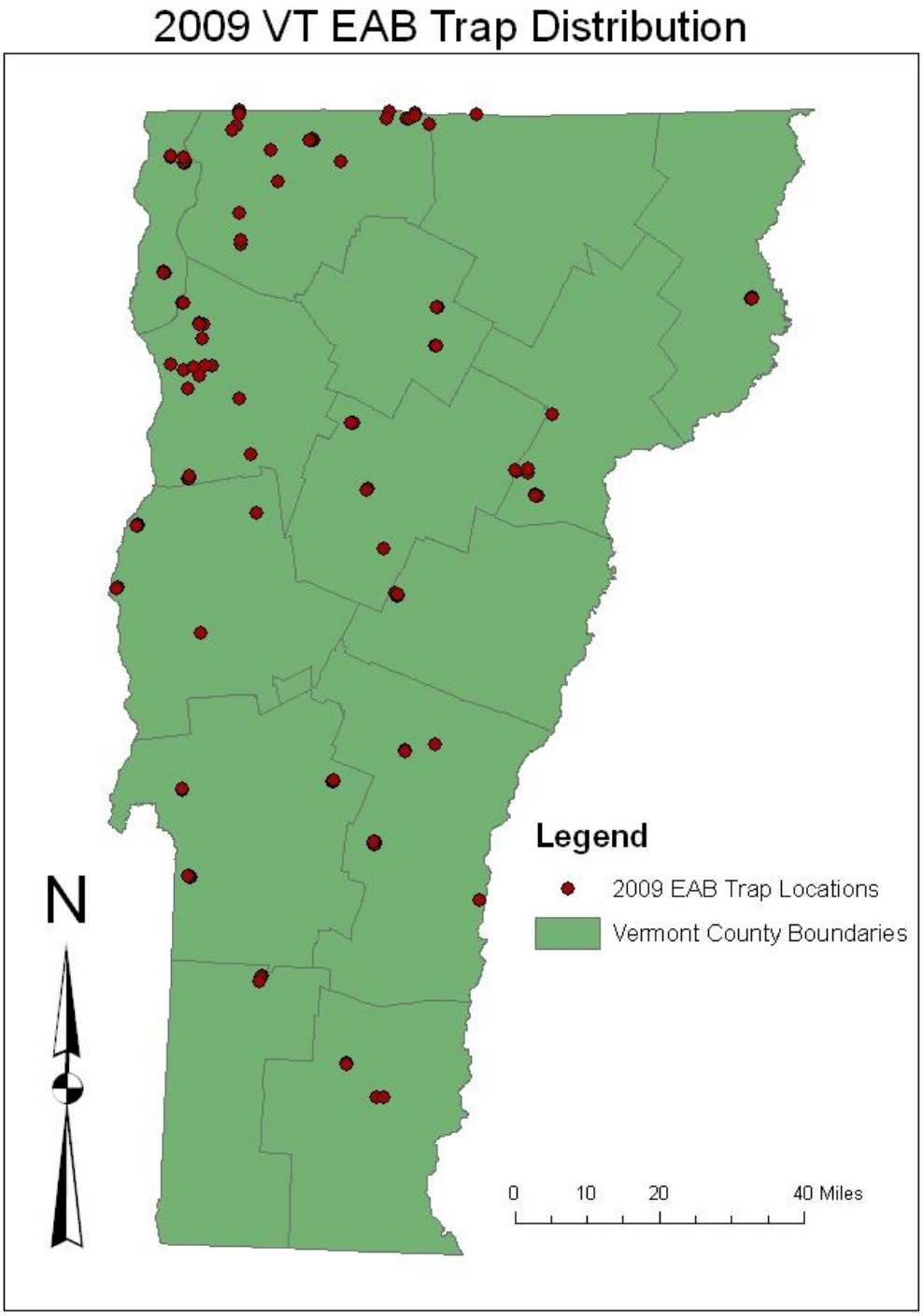
G. **If appropriate, explain why objectives were not met**
All objectives were met.

H. **Where appropriate, explain any cost overruns**-
There were no cost overruns.

I. **NAPIS database submissions**-
All data was entered into NAPIS and ISIS

*indicates information required per 7 CFR 3016.40 and 7 CFR 3019.51

Map 1-Map of all Vermont EAB trap locations set in 2009



Map 2- Map of all surveyed counties and current pest distribution of Emerald Ash borer in VT and the United States (Current as of 3/22/10)

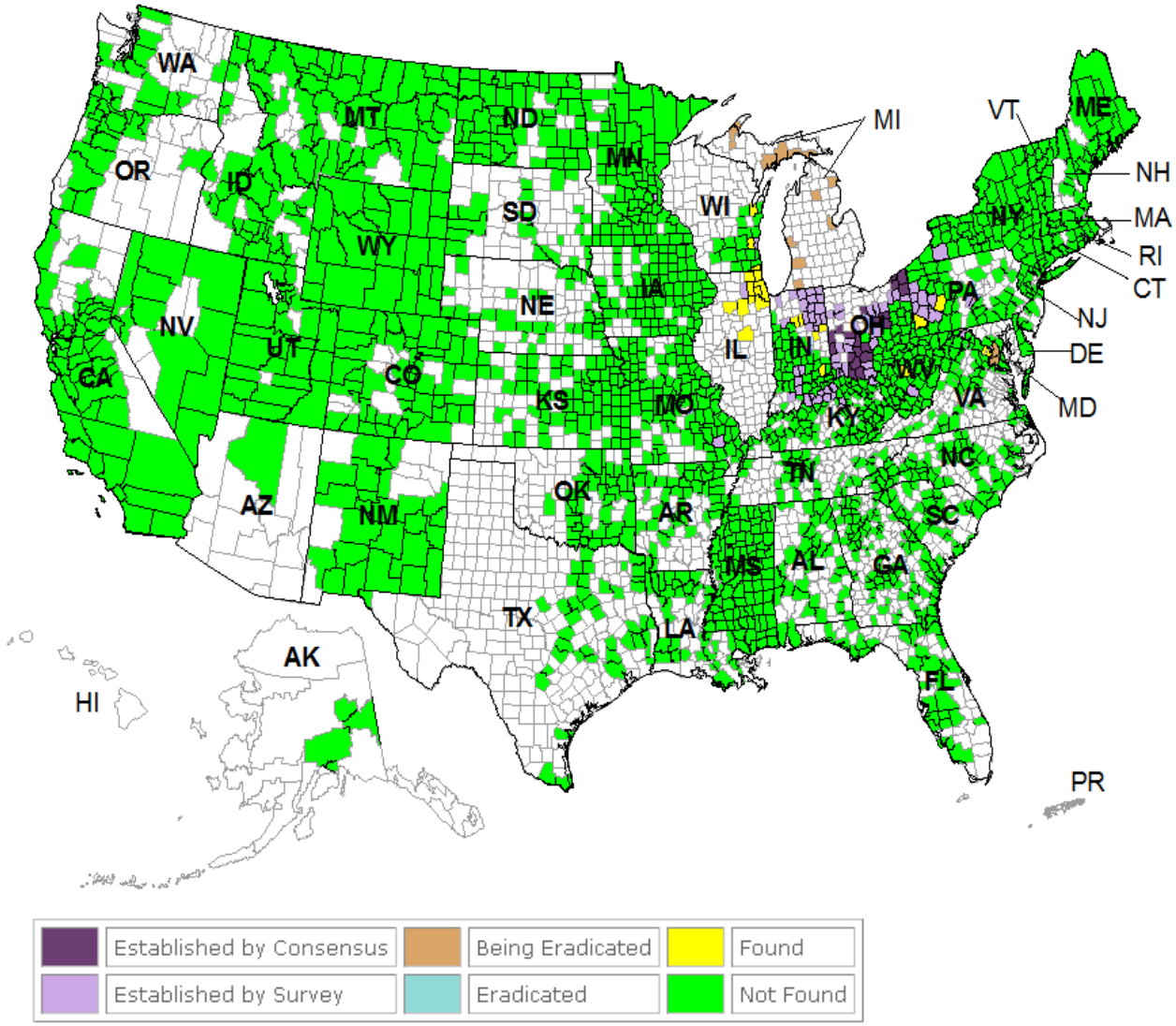


Table 2- Summary of trap data for the 2009 Vermont Emerald Ash Borer survey

RecordName	DBH	AddressLine1	City	Latitude	Longitude	Land Ownership
VTEAB0901	10.0	Townshend State Park	Townshend	43.039700	-72.692350	State
VTEAB0902	10.0	Townshend State Park	Townshend	43.040417	-72.692650	State
VTEAB0903	12.0	Townshend State Park	Townshend	43.041600	-72.691150	State
VTEAB0904	12.0	Townshend State Park	Townshend	43.041417	-72.691200	State
VTEAB0905	12.0	Ascutney State Park	Ascutney	43.434283	-72.408083	State
VTEAB0906	12.0	Ascutney State Park	Ascutney	43.434233	-72.407933	State
VTEAB0907	8.0	Ascutney State Park	Ascutney	43.435400	-72.409100	State
VTEAB0908	8.0	Ascutney State Park	Ascutney	43.435717	-72.410400	State
VTEAB0913	14.5	Coolidge State Park	Plymouth	43.546962	-72.698481	State
VTEAB0914	8.3	Coolidge State Park	Plymouth	43.546033	-72.694510	State
VTEAB0915	19.8	Coolidge State Park	Plymouth	43.553255	-72.697586	State
VTEAB0916	12.6	Coolidge State Park	Plymouth	43.552688	-72.702087	State
VTEAB0917	13.5	Gifford Woods State Park	Killington	43.675279	-72.812389	State
VTEAB0918	18.3	Gifford Woods State Park	Killington	43.673733	-72.814278	State
VTEAB0919	13.8	Gifford Woods State Park	Killington	43.672287	-72.812159	State
VTEAB0920	16.1	Gifford Woods State Park	Killington	43.674505	-72.810942	State
VTEAB0921	8.0	Silver Lake State Park	Barnard	43.731634	-72.615104	State
VTEAB0922	21.5	Silver Lake State Park	Barnard	43.733160	-72.613401	State
VTEAB0923	9.1	Silver Lake State Park	Barnard	43.734623	-72.613141	State
VTEAB0924	12.1	Silver Lake State Park	Barnard	43.733467	-72.612587	State
VTEAB0925	9.0	Little River State park	Waterbury	44.389728	-72.765588	State
VTEAB0926	11.0	Little River State park	Waterbury	44.389450	-72.759801	State
VTEAB0927	13.0	Little River State park	Waterbury	44.390034	-72.759093	State
VTEAB0928	10.0	Little River State park	Waterbury	44.390452	-72.767215	State
VTEAB0943	12.0	Lake Carmi State Park	Franklin	44.956329	-72.875066	State
VTEAB0944	7.0	Lake Carmi State Park	Franklin	44.957838	-72.876675	State
VTEAB0945	10.0	Lake Carmi State Park	Franklin	44.955735	-72.882793	State
VTEAB0946	16.0	Lake Carmi State Park	Franklin	44.95478	-72.885452	State
VTEAB0951	10.0	Button Bay State Park	Vergennes	44.183483	-73.356347	State
VTEAB0952	13.5	Button Bay State Park	Vergennes	44.182652	-73.359648	State
VTEAB0953	8.7	Button Bay State Park	Vergennes	44.181963	-73.358079	State
VTEAB0954	13.7	Button Bay State Park	Vergennes	44.182353	-73.362128	State
VTEAB0955	9.5	Lakeview Campground	Burlington	44.49265	-73.23518	Municipal

VTEAB0956	15.0	Intervale	Burlington	44.50029	-73.2081	Municipal
VTEAB0957	14.5	Appletree Park	Burlington	44.50576	-73.26972	Municipal
VTEAB0958	15.0	Allis State Park	Randolph	44.049326	-72.644297	State
VTEAB0959	11.0	Allis State Park	Randolph	44.043908	-72.637836	State
VTEAB0960	9.5	Allis State Park	Randolph	44.044274	-72.636509	State
VTEAB0961	11.0	Allis State Park	Randolph	44.046601	-72.63525	State
VTEAB0965	18.0	North Hero State Park	North Hero	44.908585	-73.236823	State
VTEAB0966	14.0	North Hero State Park	North Hero	44.909024	-73.239345	State
VTEAB0967	10.0	North Hero State Park	North Hero	44.913202	-73.237639	State
VTEAB0968	16.0	North Hero State Park	North Hero	44.918180	-73.241222	State
VTEAB0969	16.0	Grand Isle State Park	Grand Isle	44.686941	-73.290890	State
VTEAB0970	20.0	Grand Isle State Park	Grand Isle	44.689897	-73.292902	State
VTEAB0971	18.0	Grand Isle State Park	Grand Isle	44.686917	-73.294395	State
VTEAB0972	14.0	Grand Isle State Park	Grand Isle	44.687089	-73.292207	State
VTEAB0973	28.0	Wimble Woods	Moretown	44.257746	-72.719904	Private
VTEAB0974	8.0	Bache Driveway	Moretown	44.255913	-72.721402	Private
VTEAB0975	15.0	East Ave, approx 200 feet south of India House	Burlington	44.481278	-73.192369	State
VTEAB0976	6.0	Williston I-89 Northbound Rest Area, Truck Parking Area	Williston	44.43642	-73.078014	State
VTEAB0977	12.0	Oakledge Condo's	Burlington	44.45535	-73.22361	Municipal
VTEAB0978	8.0	Lake Saint Catherine State Park	Poultney	43.4828	-73.20891	State
VTEAB0979	13.5	Niquette Bay State Park	Colchester	44.588599	-73.189916	State
VTEAB0980	21.0	Niquette Bay State Park	Colchester	44.584421	-73.192198	State
VTEAB0981	10.0	Sandbar State Park	Milton	44.626712	-73.239736	State
VTEAB0982	8.0	Sandbar State Park	Milton	44.628479	-73.235993	State
VTEAB0983	8.0	Elmore State Park	Elmore	44.545150	-72.529740	State
VTEAB0984	30.0	Elmore State Park	Elmore	44.545450	-72.529480	State
VTEAB0985	22.0	Elmore State Park	Elmore	44.545220	-72.532440	State
VTEAB0986	28.0	Elmore State Park	Elmore	44.543580	-72.529370	State
VTEAB0987	18.0	Green River Resevoir	Morristown	44.621820	-72.526000	State
VTEAB0988	32.0	Green River Resevoir	Morristown	44.621870	-72.525560	State
VTEAB0989	20.0	Green River Resevoir	Morristown	44.621160	-72.527010	State
VTEAB0990	32.0	Green River Resevoir	Morristown	44.620120	-72.527160	State
VTEAB0991	8.0	Jamaica State Park	Jamaica	43.105580	-72.772870	State
VTEAB0992	14.0	Jamaica State Park	Jamaica	43.106300	-72.773610	State
VTEAB0993	11.0	Jamaica State Park	Jamaica	43.108380	-72.774510	State
VTEAB0994	8.0	Jamaica State Park	Jamaica	43.107490	-72.773350	State
VTEAB0995	19.0	Townshend	Townshend	43.039970	-72.671200	Private
VTEAB0996	8.0	Townshend	Townshend	43.040240	-72.671270	Private
VTEAB0997	12.0	Townshend	Townshend	43.039720	-72.670950	Private
VTEAB0998	10.0	Townshend	Townshend	43.039920	-72.670990	Private
VTEAB0999	12.0	Sheldon Pond Road	Sheldon	44.871970	-72.975930	State
VTEAB09100	10.0	Bomoseen State Park	Fair Haven	43.657310	-73.228027	State

VTEAB09101	10.3	DAR State Park	Addison	44.057619	-73.412873	State
VTEAB09102	16.5	DAR State Park	Addison	44.055962	-73.414565	State
VTEAB09103	12.8	DAR State Park	Addison	44.055076	-73.415581	State
VTEAB09104	9.0	DAR State Park	Addison	44.055048	-73.413427	State
VTEAB09105	12.0	Mt. Philo State Park	Charlotte	44.277580	-73.220330	State
VTEAB09106	15.0	Mt. Philo State Park	Charlotte	44.407848	-72.203035	State
VTEAB09107	8.5	Mt. Philo State Park	Charlotte	44.277776	-73.215866	State
VTEAB09108	16.0	Mt. Philo State Park	Charlotte	44.280940	-73.215110	State
VTEAB09109	11.0	Bomoseen State Park	Fair Haven	43.654950	-73.228850	State
VTEAB09110	9.0	Bomoseen State Park	Fair Haven	43.653840	-73.226300	State
VTEAB09111	16.0	Bomoseen State Park	Fair Haven	43.655773	-73.227995	State
VTEAB09112	13.0	Emerald Lake State Park	East Dorset	43.282000	-73.005140	State
VTEAB09113	10.0	Emerald Lake State Park	East Dorset	43.280860	-73.007880	State
VTEAB09114	14.0	Emerald Lake State Park	East Dorset	43.279322	-73.007479	State
VTEAB09115	12.0	Lake Saint Catherine State Park	Poultney	43.479690	-73.203100	State
VTEAB09116	10.0	Lake Saint Catherine State Park	Poultney	43.481240	-73.205250	State
VTEAB09117	12.0	Jasper Mine Road	Colchester	44.584485	-73.181515	Private
VTEAB09118	18.0	Lake Saint Catherine State Park	Poultney	43.480180	-73.205000	State
VTEAB09119	7.0	Emerald Lake State Park	East Dorset	43.272630	-73.011250	State
VTEAB09120	6.0	Georgia Rest Area I89 North Bound	Georgia	44.746940	-73.077897	State
VTEAB09121	10.0	Highgate Border	Highgate	45.014198	-73.085749	Federal
VTEAB09122	10.0	Highgate Border	Highgate	45.014198	-73.085749	Federal
VTEAB09123	8.0	Rte. 7 South-Highgate Springs	Highgate Springs	45.008540	-73.083560	State
VTEAB09124	13.0	Entrance to DFA-Rte 7 South	Highgate Springs	45.006760	-73.082300	State
VTEAB09125	9.0	Rte 7 South by Highway	Highgate Center	44.983760	-73.092830	State
VTEAB09126	9.0	Highgate Springs Cemetery	Highgate Springs	44.974905	-73.104472	State
VTEAB09127	10.0	Pull Off Rte 7, Fishing area	Highgate Center	44.934788	-72.995444	State
VTEAB09128	8.0	Georgia Rest Area I89 South Bound	Georgia	44.755690	-73.078380	State
VTEAB09129	8.0	Colchester Costco Parking Lot	Colchester	44.503770	-73.175760	Private
VTEAB09130	6.0	Colchester Costco Parking Lot	Colchester	44.503290	-73.174980	Private
VTEAB09131	13.0	St. Albans South Main Street	St. Albans	44.803710	73.086980	Municipal
VTEAB09132	19.0	St. Albans South Main Street	St. Albans	44.809370	-73.083370	Municipal

VTEAB09133	13.0	Colchester Weigh Station I89 South	Colchester	44.557627	-73.182878	State
VTEAB09134	6.0	Enosburg Falls-Hannaford's	Enosburg Falls	44.912250	-72.796850	Private
VTEAB09135	18.0	Richford Border Crossing	Richford	45.013580	-72.662550	Federal
VTEAB09136	8.0	Richford Railway Crossing	Richford	44.997110	-72.667870	State
VTEAB09137	16.0	East Richford Rte. 105A. Right after RR crossing.	East Richford	44.997390	-72.611050	State
VTEAB09138	20.0	East Richford Border Crossing, By River	East Richford	45.010780	-72.587350	Federal
VTEAB09139	10.0	Rte 105 Pull off #1	East Richford	44.998170	-72.604950	State
VTEAB09140	9.0	Rte 105 Pull off #2, Junction with Johnson Rd	Richford	45.004140	-72.587210	State
VTEAB09141	8.0	Rte 105 Pull off #3, Richford/Jay Line	Richford	44.986590	-72.549580	State
VTEAB09142	8.0	North Troy Border Crossing	North Troy	45.006360	-72.415780	Federal
VTEAB09143	6.0	Hegeman Ave. Off of Barnes Ave.	Essex	44.502120	-73.153720	Municipal
VTEAB0962	11.0	Thetford State Park	Thetford	43.813627	-72.238508	State
VTEAB0963	6.0	Thetford State Park	Thetford	43.811096	-72.236216	State
VTEAB0964	7.0	Thetford State Park	Thetford	43.809426	-72.235433	State
VTEAB0909	16.0	Amnity Pond area	Pomfret	43.74612512	-72.53003525	Private
VTEAB0910	12.0	Morse Rd	Cornwall	43.96660991	-73.17881324	Private
VTEAB0911	20.0	Hinesburg	Hinesburg	44.326420	-73.045200	Municipal
VTEAB0912	21.0	Starksboro	Starksboro	44.210240	-73.027990	State
VTEAB0931	10.0	Stillwater Campground	Groton	44.290420	-72.27141	State
VTEAB0932	18.0	Stillwater Campground	Groton	44.298640	-72.27151	State
VTEAB0933	16.0	Stillwater Campground	Groton	44.293750	-72.30704	State
VTEAB0934	10.0	Stillwater Campground	Groton	44.294430	-72.30995	State
VTEAB0935	14.0	Ricker Pond State Park	Groton	44.243830	-72.24562	State
VTEAB0936	14.0	Ricker Pond State Park	Groton	44.244300	-72.24672	State
VTEAB0937	8.0	Ricker Pond State Park	Groton	44.245690	-72.25352	State
VTEAB0938	12.0	Ricker Pond State Park	Groton	44.245450	-72.25179	State
VTEAB0929	10.0	Northfield	Northfield	44.13988	-72.67388	Private
VTEAB0930	10.0	northfield	northfield	44.13994	-72.67392	Private
VTEAB0947	10.0	Goosepoint Campground	Alburgh	44.920178	-73.276421	Private
	11.0	Goosepoint	Alburgh	44.921358	-73.27594	Private

		Campground				
VTEAB0949	10.0	Goosepoint Campground	Alburgh	44.921462	-73.275996	Private
VTEAB0950	9.0	Goosepoint Campground	Alburgh	44.921272	-73.275862	Private
VTEAB0939	10.0	Maidstone State Park	Maidstone	44.637040	-71.644970	State
VTEAB0940	14.0	Maidstone State Park	Maidstone	44.637410	-71.64438	State
VTEAB0941	16.0	Maidstone State Park	Maidstone	44.635840	-71.64658	State
VTEAB0942	8.0	Maidstone State Park	Maidstone	44.636160	-71.64536	State

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Cities of: Burlington, Winooski, St. Albans, Colchester

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US Customs and Border Patrol/Agriculture Inspection: Highgate, VT Station

USDA-APHIS-PPQ Staff: Stephen Lavallee

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